KOLMOGOROV, A.N.

2

Kolmogorov, A. N. On the Skorohod convergence. 1-F\W
Teor. Veroyatnost. i Primenen. 1 [illegible]
[illegible]
Consider the space D of functions [illegible]
[illegible]

By intervention of the graph space $T \times X$ it is possible to convert D into a complete metric space. Not all details are given, and there [illegible] gating the definition of ω^*.

K. L. Chung

KOLMOGOROV, A.N.

1-F\W

Kolmogorov, A. N. Deux théorèmes asymptotiques uniformes pour des sommes des variables aléatoires. Teor. Veroyatnost. i Primenen. 1 (1956), 426–436. (Russian. French summary)

Soit $\xi_1, \cdots, \xi_n$ des variables aléatoires indépendantes, $\xi = \xi_1 + \cdots + \xi_n$ et $\Phi, F_1, \cdots, F_n$ les fonctions de distribution correspondantes. Désignons par $\mathfrak{E}$ l'ensemble des distributions dégénérées $E(x)=0$ pour $x \leqq a$ et 1 pour $x>a$, et par Θ l'ensemble des distributions infiniment divisibles.

Théorème I. Il existe une constante C telle que pour tout $\varepsilon>0$, $L>2l>0$ les inégalités $E_k(x-l)-\varepsilon \leqq F_k(x) \leqq E_k(x+l)+\varepsilon$ $(E_k \in \mathfrak{E};\ k=1, \cdots, n;\ -\infty<x<+\infty)$ impliquent l'existence d'une fonction $\Psi \in \Theta$ pour laquelle $\Psi(x-L)-\delta \leqq \Phi(x) \leqq \Psi(x+L)+\delta$ $(-\infty<x<+\infty)$ avec

$$\delta = C\max\{Ll^{-1}(\log Ll^{-1})^{\frac{1}{2}}, \varepsilon^{1/5}\}.$$

Dans le cas des distributions F_k égales $F_k(x) \equiv F(x)$ $(k=1, \cdots, n)$ on démontre un théorème plus simple

Théorème II. Il existe une constante C telle que pour tout n et F on peut trouver une fonction $\Psi \in \Theta$ vérifiant l'inégalité $|\Psi(x)-\Phi(x)| \leqq Cn^{-1/5}$ $(-\infty<x<+\infty)$.

Résumé de l'auteur

KOLMOGOROV, A.N.; STECHKIN, S.B.

Sergei Mikhailovich Nikol'skii; on the fiftieth anniversary of
his birthday. Usp.mat.nauk 11 no.2:239-244 Mr-Ap '56. (MLRA 9:8)
(Nikol'skii, Sergei Mikhailovich, 1905-) (Bibliography--
--Mathematics)

KOLMOGOROV, A.N., akademik.

Meetings with French mathematicians. Nauka i zhizn' 23 no.5:5-6 '56.
(MLRA 9:8)

(France--Mathematicians)

SUBJECT	USSR/MATHEMATICS/Theory of functions	CARD 1/1	PG - 377
AUTHOR	KOLMOGOROV A.N.		
TITLE	On the representation of continuous functions of several variables by superposition of continuous functions of a smaller number of variables.		
PERIODICAL	Doklady Akad. Nauk 108, 179-182 (1956) reviewed 11/1956		

The author gives an interesting contribution to the solution of Hilbert's thirteenth problem and obtains some surprising results. It is established that every continuous function of an arbitrarily large number of variables can be represented as a finite superposition of continuous functions of not more than three variables. For n = 4 e.g. there holds a representation of the form

$$f(x_1,x_2,x_3,x_4) = \sum_{r=1}^{4} h^r\left[x_4, g_1^r(x_1,x_2,x_3), g_2^r(x_1,x_2,x_3)\right] .$$

The question of the representability of a function of three variables by superposition of continuous functions of two variables is not answered. But it is shown that this representation becomes possible if auxiliary variables are admitted which run through a universal tree instead of the number line.

KOLMOGOROV, A. N. (Acad.)

"Theory of Transmission of Information and Limits of Its Applicability,"

paper read at the Session of the Acad. Sci. USSR, on Scientific Problems of Automatic Production, 15-20 October 1956.
Avtomatika i telemekhanika, No. 2, p. 182-192, 1957.

9015229

SUBJECT	USSR/MATHEMATICS/Topology	CARD 1/3	PG - 558
AUTHOR	KOLMOGOROV A.N.		
TITLE	On certain asymptotic characteristics of completely bounded metric spaces.		
PERIODICAL	Doklady Akad.Nauk 108, 385-388 (1956) reviewed 1/1957		

For a finite set X the number $I_X = [\log_2 |X|] + 1$ is considered as a measure of the the quantity of information concerning the determination of a given element of X. If X is an infinite metric (and totally bounded) space and $\varepsilon > 0$ let:

a) $N_X^a(\varepsilon) = \inf |\tilde{X}|$, $\tilde{X} \subseteq X$, each point of X being in a distance $\leq \varepsilon$ of some $\tilde{x} \in \tilde{X}$; b) $N_X^b(\varepsilon) = \inf |F|$, F being covering of X by sets of dyameter $\leq \varepsilon$ each; c) $N_X^c(\varepsilon) = \sup |S|$, S consisting of points pairwise distant $> \varepsilon$.

These functions are used for approximative ε-informations; they $\longrightarrow \infty$ for $\varepsilon \to 0$. $N_X^a(\varepsilon) \leq N_X^b(\varepsilon) \leq N_X^c(\varepsilon) \leq N_X^a(\frac{\varepsilon}{2})$ (Theorem 1).

Let $f \sim g$, $f \asymp g$ respectively mean $\underline{\lim}\,(f : g) = 1$, and $\underline{\lim}\,(f : g) > 0$, $\overline{\lim}\,(f : g) < \infty$, for $\varepsilon > 0$. In the theory of informations, the strong

III	$H_{p,\alpha}$			$\asymp (\log \frac{1}{\varepsilon})^{s+1}$
IV	α_β^s			$\asymp (\frac{1}{\varepsilon})^{\frac{s}{\beta(p+\alpha)}}$

Doklady Akad.Nauk 108, 385-388 (1956) CARD 3/3 PG - 558

M^s is any bounded part of R^s with non void interior; A^s is the set of all uniform analytic functions of s variables defined in a bounded open region G of the s-dimensional complex space.

$H^s_{p\alpha}$ is the set of all real-valued functions in I^s having the derivatives of order $p \geqslant 0$ satisfying the Hölder condition with a common constant. $\mathcal{Q}^s_p$ is the set of functionals φ in A^s such that $|\varphi| \leqslant C_4$, $|\varphi(f)-\varphi(g)| \leqslant C_5 \left[\varrho(p,g)\right]^{\beta}$, $0<\beta \leqslant 1$; $\mathcal{V}^s_{\gamma p\alpha;\beta}$ is the analogous set of all the real-valued functionals defined in $H^s_{p;\alpha}$. The metric in each of the spaces considered is properly defined.

If $X \subseteq \bigcup_{r=1}^{s} X_r$, then $I^z_X(\varepsilon) \leqslant \sum_{r=1}^{s} N^z_{X_p}(\varepsilon)$, $z \in \{a,b,c\}$ (Theorem 2), and $N^c_F(\varepsilon) \leqslant \prod_{r=1}^{s} N^c_{F_{X_r}}(\varepsilon)$ (Theorem 3); here for a given $X' \subseteq X$ and $F \subseteq Y^X$ (set of all mappings of X into Y) $F_{X'}$ denotes all the mappings of X' into Y each of which is prolongable to be a mapping of X into Y that belongs to F.

Kolmogorov, A.N.

SUBJECT USSR/MATHEMATICS/Theory of probability CARD 1/2 PG - 995
AUTHOR GELFAND I.M., KOLMOGOROV A.N., YAGLOM A.M.
TITLE On a general definition of an amount of information.
PERIODICAL Doklady Akad.Nauk 111, 745-748 (1956)
reviewed 7/1957

Let $\mathfrak{S}$ be a Boolean algebra and let P denote a probability on $\mathfrak{S}$. If $\mathfrak{A}$ and $\mathfrak{L}$ are two finite subalgebras of $\mathfrak{S}$, then the expression

$$I(\mathfrak{A},\mathfrak{L}) = \sum_{i,j} P(A_iB_j) \log \frac{P(A_iB_j)}{P(A_i)P(B_j)}$$

is by definition "the amount of information contained in the results of the experiment $\mathfrak{A}$ relative to the results of the experiment $\mathfrak{L}$" ($I(\mathfrak{A},\mathfrak{L}) = I(\mathfrak{L},\mathfrak{A})$). Generally,

$$(1) \qquad I(\mathfrak{A},\mathfrak{L}) = \sup_{\mathfrak{A}_1 \leq \mathfrak{A},\ \mathfrak{L}_1 \leq \mathfrak{L}} I(\mathfrak{A}_1,\mathfrak{L}_1),$$

where $\mathfrak{A}_1$ and $\mathfrak{L}_1$ are finite subalgebras; symbolically (1) can be written

KOLMOGOROV, A.N., akademik.

The training of young scientific workers in the U.S.S.R.
Mir nauk no.1:8-13 '57. (MLRA 10:7)
(Science--Study and teaching)

KOLMOGOROV, A.N. (Moscow)

Basis of the theory of real numbers. Mat. pros.no.2:169-171 '57.
(MIRA 11:7)

(Numbers, Theory of)

KOLMOGOROV, A.N.

SOV/52-2-4-7/7

AUTHOR: None Given.

TITLE: A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probabilities. (Moscow, February - May, 1957). (Rezyume dokladov, sdelannykh na zasedaniyakh nauchno-issledovatel'skogo seminara po teorii veroyatnostey. (Moskva, Fevral' - May 1957 g.)

PERIODICAL: Teoriya Veroyatnostey i yeye Primeneniya, 1957, Vol.II, Nr.4, pp.478-488. (USSR)

ABSTRACT: Kolmogorov, A.N., On stochastic processes (General definitions of regularity and singularity. The amount of information per unit of time). Freyman, G.A. (Yelabuga), Local limit theorems for large deviations from the mean and their application to number theory. An expression is given for the number of solutions of the equation

$x_1^n + x_2^n + \dots + x_k^n = N$ as $k \to \infty$ and $k < \gamma N$, where

Card 1/[illegible] $0 < \gamma \leq 1$, and N is a positive integer.

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, A.N.

20-5-10/60

AUTHOR KOLMOGOROV, A.N.

TITLE On the Representation of Continuous Functions of many Variables by Superposition of Continuous Functions of one Variable and Addition.-
(O predstavlenii nepreryvnykh funktsiy neskol'kikh peremennykh v vide superpozitsiy nepreryvnykh funktsiy odnogo peremennogo i slozheniya.- Russian)

PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 114, Nr 5, pp 953-956 (USSR)

ABSTRACT The present paper discussed in short the proof of the following theorem: In the case of any whole $n > 2$ such steady real functions $\psi^{pq}(x)$ defined on the unit stretch $E^1 = [0;1]$ exist that each steady real function $f(x_1, \ldots x_n)$ defined on an n-dimensional unit cube E^n can be represented in the form

$$f(x_1, \ldots x_n) = \sum_{q=1}^{q=2n+1} \chi_q \left[\sum_{p=1}^{n} \psi^{pq}(x_p) \right]$$

Here the functions $\chi_q(y)$ are real and steady.

CARD 1/2

SUBMITTED: 20.6.1957

AVAILABLE: Library of Congress.

CARD 2/2

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R00082391000

KOLMOGOROV, A.N.

NEMCHENKO, V.S.; BOCHAROV, M.D.; KRISTOSTUR'YAN, N.G.; CHERKASOV, V.I.; ANDREYANOV, V.V.; KAUFMAN, V.M.; PAKHMANOV, V.F.; ZVORYKIN, A.A., otv.red.; ANICHKOV, N.N., red.; BARDIN, I.P., red.; BLAGONRAVOV, A.A., red.; VVEDENSKIY, B.A., red.; GRIGOR'YEV, A.A., red.; KAPUSTINSKIY, A.F., red.; KOLMOGOROV, A.N., red.; MIKHAYLOV, A.A., red.; OPARIN, A.I., red.; PETROV, F.N., red.; STOLETOV, V.N., red.; STRAKHOV, N.M., red.; FIGUROVSKIY, N.A., red.; KOSTI, S.D., tekhn.red.

[Biographical dictionary of leaders in the natural sciences and technology] Biograficheskii slovar' deiatelei estestvoznaniia i tekhniki. Vol.1. A - L. Otvetstvennyi red. A.A.Zvorykin. Red. kollegiia: N.N.Anichkov i dr. Moskva, Gos.nauchn.izd-vo "Bol'shaia Sovetskaia Entsiklopediia." 1958. 548 p. (MIRA 12:4)

1. Redaktsiya istorii estestvoznaniya i tekhniki Bol'shoy Sovetskoy Entsiklopedii (for Nemchenko, Bocharov, Kristostur'yan, Cherkasov, Andreyanov, Kaufman, Pakhmanov).

(Scientists)

KOLMOGOROV, A. N.

"Some Questions of Approximation and Representation of Functions," with V. I. Arnold

"Linear Dimensionality of Linear Topological Spaces."

papers submitted at International Congress Mathematicians, Edinburgh, 14 - 21 Aug 58.

KOLMOGOROV, A.N

SOV/52-3-2-10/10

AUTHOR: None Given

TITLE: A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958 (Rezyume dokladov, sdelannykh na zasedaniyakh nauchno-issledovatel'skogo seminara po teorii veroyatnostey, Moskva, sentyabr'-mart 1957-58 g.)

PERIODICAL: Teoriya veroyatnostey i yeye primeneniya, 1958, Vol III, Nr 2, pp 212-216 (USSR)

ABSTRACT: A. N. Kolmogorov - Ergodic stationary random processes with a discrete spectrum. If S is a set of numbers and $\xi(t)$ is a stationary ergodic function defined for all random values of t as

$$\xi(t) = \sum_{\lambda \in S} \varphi(\lambda) e^{i\lambda t}$$

then $\rho(\lambda) = |\varphi(\lambda)|$ is not random. Therefore, the unit probability can be expressed as $\rho(\lambda) = +\sqrt{f(\lambda)} > 0$ and $\varphi(\lambda) = \rho(\lambda) e^{i\theta(\lambda)}$ where $\theta(\lambda)$ is defined as mod 2π and represents a random element of the space A_S of all the

Card 1/~~6~~ 3

A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

functions $\alpha(\lambda)$. The space A_S represents a compact group with a sub-group B_S . The factorial group

$\Gamma_S = A_S - B_S$ will determine the distribution of the function $\xi(t)$ becoming isomorphic of the other two.

Ye. B. Dynkin - Infinitesimal operators of "jump" Markov processes. Published in Vol III, Nr 1 of this journal.

V. A. Volkonskiy - A random change of time in strictly Markov processes. If $x_t = x(t, \omega)$ is a homogeneous Markov process on the space $\mathcal{E}$ and $\tau_t(\omega)$ is a function non-decreasing at all ω , and that $\tau_t(\omega)$ at all t is a random value not dependent on future, then the function $y(t, \omega) = x(\tau_t(\omega), \omega)$ is a process obtained from x_t with random change of time τ_t . At some conditions of τ_t the

Card 2/~~6~~
3

SOV/52-3-2-10/10

A Summary of Papers Presented at the Sessions of the Scientific Research Seminar on the Theory of Probability, Moscow, September-March 1957-1958

the process y_t becomes a homogeneous strictly Markov process. In the case of a homogeneous process with a random change of time and a uniform deformation of space it is possible to obtain any continuous Markov process which will be regular in the interior and absorbed near the boundary.

R. L. Dobrushin - A statistical problem of detecting a signal in the noise of a multi-channel system reduced to stable distribution laws. Published in this issue.

V. M. Zolotarev - Some new properties of stable distribution laws. Published in Vol II, Nr 4 of this journal.

R. A. Minlos - On the extension of the generalized random process to additive measure. Any exact process, such as Gelfand's, based on the cylindrical set of numbers on linear topologic space E' and extended into a space E will retain its additive property defined as the set B on the space E' . (There are 2 references, 1 Soviet and 1 French).

D. M. Chibisov - Limit distribution for the number of runs in a Bernouilli Trials. If k represents a number of independent runs in two trials, the probability of a positive

Card 3/3

AUTHOR: Kolmogorov, A.N., Krasnosel'skiy, M.A. SOV/42-13-3-12/41

TITLE: Mark Grigor'yevich Kreyn (on the occasion of his 50th birthday) (Mark Grigor'yevich Kreyn (K pyatidesyatiletiyu so dnya rozhdeniya))

PERIODICAL: Uspekhi Matematicheskikh Nauk, 1958, Vol 13, Nr 3, pp 213-224 (USSR)

ABSTRACT: This is a short biography and very detailed appreciation of the mathematical merits of the versatile and extraordinary intensively working mathematician Kreyn. It contains a photo of Kreyn and a chronological list of his scientific publications with 151 numbers (from 1926 to 1958).

Card 1/1

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

AUTHORS: ~~Kolmogorov, A.N.,~~ and Uspenskiy, V.A. SOV/42-13-4-1/11

TITLE: On the Definition of the Algorithm (K opredeleniyu algoritma)

PERIODICAL: Uspekhi matematicheskikh nauk, 1958, Vol 13, Nr 4, pp 3-28 (USSR)

ABSTRACT: The authors remark that the present paper is the result of a futile search for a generalization and extension of the usual definition of the notion "algorithm". The authors' aim is to show that in the momentary state of the science, the most general possible notion of the algorithm is combined quite naturally with the notion of a partially recursive function. § 1 gives the survey of existant definitions and investigates the degree of their logical completeness and their generality. § 2 proposes a new definition of the algorithm (see Kolmogorov Ref 3). § 3 shows that every algorithm which corresponds to this new definition, however, finally ends in the calculation of the values of a partially recursive function. Two appendices give definitions and facts on recursive functions and an example for an algorithm.
There are 22 references, 6 of which are Soviet, 13 American, 2 German, and 1 English.

Card 1/1

AUTHOR: Kolmogorov, A.N. (Academician) 20-119-5-5/59

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

TITLE: A new Metric Invariant of the Transitive Dynamic Systems and the Automorphisms of Lebesgue Spaces (Novyy metricheskiy invariant transitivnykh dinamicheskikh sistem i avtomorfizmov prostranstv Lebega)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 5, pp 861-864 (USSR)

ABSTRACT: 1. Let γ be the Boolean algebra of the measurable sets considered mod 0 of the Lebesgue space M with the measure μ, $\mu(M) = 1$. Let $\mathfrak{L}$ be a subalgebra of γ closed in the metric $\varrho(A,B) = \mu((A-B)\cup(B-A))$. It generates a decomposition $\xi_{\mathfrak{L}}$ of M defined mod 0, where $A \in \mathfrak{L}$ then and only then if A mod 0 can be established by complete elements of $\xi_{\mathfrak{L}}$. On the elements C of $\xi_{\mathfrak{L}}$ there is defined a canonic system of measures μ_C. For every $x \in C$ let $\mu_x(A|\mathfrak{L}) = \mu_C(A \cap C)$. For the subalgebras $\mathfrak{A}$, $\mathfrak{B}$, $\mathfrak{L}$ of γ and $C \in \xi_{\mathfrak{L}}$ let

$$(1)\quad I_C(\mathfrak{A},\mathfrak{B}|\mathfrak{L}) = \sup \sum_{i,j} \mu_x(A_i \cap B_j) \log \frac{\mu_x(A_i \cap B_j)}{\mu_x(A_i)\mu_x(B_j)},$$

where the supremum is taken over all finite decompositions $M = A_1 \cup A_2 \cup \dots \cup A_n$, $M = B_1 \cup B_2 \dots \cup B_n$ for which $A_i \cap A_j = N$, $B_i \cap B_j = N$, $i \neq j$, (N - empty set). (1) can be interpreted as the

Card 1/5

AUTHOR: Kolmogorov, A.N., Academician SOV/20-120-2-3/63

TITLE: On Linear Dimension of Topological Vector Spaces (O lineynoy razmernosti topologicheskikh vektornykh prostranstv)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 120, Nr 2, pp 239-241 (USSR)

ABSTRACT: The author introduces the linear dimension $\delta(E)$ of the topological vector space E so that the following properties hold: 1) If E is isomorphic to a closed linear subspace of the topological vector space E', then $\delta(E) \leq \delta(E')$ and 2) if E' can be mapped linearly and continuously onto E, then $\delta(E) \leq \delta(E')$. It is shown that every other function d(E) which satisfies 1) and 2), can be represented in the form $d(E) = f[\delta(E)]$, where from $\delta(E) \leq \delta(E')$ there follows $d(E) \leq d(E')$. The most interesting assertion is that the inequations consisting between the linear dimensions $\delta(E)$ inthe case of analytic functions prove and confirm the intuitive idea of the classical analysis that the totality of functions of several variables has "more elements". But in the function spaces of finite smoothness this idea is not confirmed by the properties of $\delta(E)$. Altogether the paper contains 10 theorems.
There are 4 references, 2 of which are Soviet, 1 French and 1 American.

SUBMITTED: February 18, 1958

1. Topology 2. Tensor analysis

Card 1/1

KoLmoGoRoV, A.N.

16(0) PHASE I BOOK EXPLOITATION SOV/3177

Matematika v SSSR za sorok let, 1917-1957. tom 1: Obzornyye stat'i (Mathematics in the USSR for Forty Years, 1917-1957). Vol. 1: Review Articles) Moscow, Fizmatgiz, 1959. 1002 p. 5,500 copies printed.

Eds: A. G. Kurosh, (Chief Ed.), V. I. Bityutskov, V. G. Boltyanskiy, Ye. B. Dynkin, G. Ye. Shilova, and A. P. Yushkevich; Ed. (Inside book): A. F. Lapko; Tech. Ed.: S. N. Akhlamov.

PURPOSE: This book is intended for mathematicians and historians of mathematic interested in Soviet contributions to the field.

COVERAGE: This book is Volume I of a major 2-volume work on the
history of Soviet mathematics. Volume I surveys the chief con-
tributions made by Soviet mathematicians during the period 1947-
1957; Volume II will contain a bibliography of major works since
1917 and biographic sketches of some of the leading mathema-
ticians. This work follows the tradition set by two earlier
works: Matematika v SSSR za pyatnadtsat' let (Mathematics in
the USSR for 15 Years) and Matematika v SSSR za tridtsat' let
(Mathematics in the USSR for 30 Years). The book is divided
into the major divisions of the field, i.e., algebra, topology,
theory of probabilities, functional analysis, etc., and con-
tributions and outstanding problems in each discussed. A list-
ing of some 1400 Soviet mathematicians is included with refer-
ences to their contributions in the field.

KOLMOGOROV, Andrey Nikolayevich; KONDRASHKOVA, S.F., red.; GEORGIYEVA, G.I., tekhn.red.

[Profession of a mathematician] O professii matematika. Izd.3, dop. Moskva, Izd-vo Mosk.univ., 1959. 28 p. (MIRA 13:1)
(Mathematics as a profession)

16(1) SOV/42-14-2-1/19

AUTHORS: Kolmogorov,A.N., and Tikhomirov,V.M.

TITLE: The ε-Entropy and ε-Capacity of Sets in Functional Spaces

PERIODICAL: Uspekhi matematicheskikh nauk,1959,Vol 14,Nr 2,pp 3-86 (USSR)

ABSTRACT: The paper is a systematic representation of results obtained from 1954 to 1958 by K.I.Babenko, A.G.Vitushkin, V.D.Yerokhin, A.N.Kolmogorov, and V.M.Tikhomirov. After a short introduction there follows: §1. Definition and fundamental properties of the functions $H_{\varepsilon}(A)$ and $C_{\varepsilon}(A)$. §2. Examples of the rigorous calculation and the estimation of these functions. §3. Typical orders of increase of these functions. §4. The ε-entropy and ε-capacity in finite-dimensional spaces. §5. ε-entropy and ε-capacity for functions of finite smoothness. §6. ε-entropy of the class of differentiable functions in the metric L^2. §7. ε-entropy of classes of analytic functions. §8. ε-entropy of classes of analytic functions bounded on the real axis. §9. ε-entropy of the spaces of real functionals. Addition 1: Theorem of A.G.Vitushkin on the impossibility to represent a function of several variables by superpositions of functions of a smaller number of variables. Addition 2: Connection with the probability

SOV/42-14-2-1/19

The ε-Entropy and ε-Capacity of Sets in Functional Spaces

theoretical treatment of signal transmission. In the text the authors mention V.I.Arnol'd, L.S.Pontryagin, L.G.Shnirl'man, N.S.Bakhvalov, I.M.Yaglom, and V.A.Kotel'nikov. The paper contains 31 theorems, among them some unpublished results of V.I.Arnol'd and V.M.Tikhomirov. There are 12 figures, and 29 references, 22 of which are Soviet, 1 German, 3 American, 1 Polish, and 2 Italian.

SUBMITTED: December 15, 1958

Card 2/2

16(1) SOV/20-124-4-6/67

AUTHOR: Kolmogorov, A.N. (Academician)

TITLE: Entropy per Time Unit as a Metric Invariant of Automorphisms (Ob entropii na yedinitsu vremeni kak metricheskom invariante avtomorfizmov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 4, pp 754-755 (USSR)

ABSTRACT: The author rejects theorems 2, 3, and 4 of his publication [Ref 1]. In [Ref 1] the author proved theorem 2 under the use of an assumption which is not satisfied. Therewith also theorem 3 and 4 are senseless. V.A.Rokhlin called the author's attention to the error by a construction of a counterexample. The author gives improved theorems with a smaller domain of action. He mentions the dissertation of D.Z.Arov (Odessa, 1957) and a paper of Ya.Sinay [Ref 2]. There are 3 Soviet references.

SUBMITTED: November 25, 1958

Card 1/1

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, Andrey Nikolayevich; FOMIN, Sergey Vasil'yevich; ZHELOBENKO, D.P., red.; YERMAKOV, M.S., tekhn.red.

[Elements of the theory of functions and of functional analysis] Elementy teorii funktsii i funktsional'nogo analiza. Moskva, Izd-vo Mosk.univ. No.2. [Measure, Lebesgue integral, Hilbert space] Mera, integral Lebega, gil'bertovo prostranstvo. 1960. 118 p. (MIRA 13:7)

(Functions) (Functional analysis)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

BERNSHTEYN, S.N.; AKHIYEZER, N.I., red.; KOLMOGOROV, A.N., red.; PETROVSKIY, I.G., red.; RYVKIN, A.Z., red.izd-va; VIDENSKIY, V.S., red.izd-va; MARKOVICH, S.G., tekhn.red.

[Collected works] Sobranie sochinenii. Moskva, Izd-vo Akad. nauk SSSR. Vol.3. [Differential equations, calculus of variations and geometry (1903-1947)] Differentsial'nye uravneniia, variatsionnoe ischislenie i geometriia (1903-1947). 1960. 438 p. (MIRA 13:8)

(Differential equations) (Calculus of variations)
(Geometry)

87984

S/052/60/005/002/001/003
C111/C222

16.6160

AUTHORS: Kolmogorov, A.N., and Rozanov, Yu.A.

TITLE: On a Strong Mixing Condition for Stationary Random Gaussian Processes

PERIODICAL: Teoriya veroyatnostey i yeye primeneniye, 1960, Vol.5, No.2, pp.222-227

TEXT: Two σ-algebras of events $\mathfrak{M}'$ and $\mathfrak{M}''$ are independent if for arbitrary $A' \in \mathfrak{M}$, $A'' \in \mathfrak{M}$ it holds: $P(A', A'') = P(A')P(A'')$.
As a measure of dependence of two σ-algebras M.Rosenblatt (Ref.1) proposed

$$\alpha(\mathfrak{M}', \mathfrak{M}'') = \sup_{A' \in \mathfrak{M}', A'' \in \mathfrak{M}''} |P(A' \cap A'') - P(A')P(A'')|.$$

For the stationary random process $\xi(t)$; $\alpha(\mathfrak{M}_{\infty}^{t}, \mathfrak{M}_{t+\tau}^{\infty})$, (where $\mathfrak{M}_{s}^{t}$ denotes the σ-algebras generated by $\xi(u)$, $s \leqslant u \leqslant t$) depends only on τ and is denoted with $\alpha(\tau)$. If $\alpha(\tau) \to 0$ for $\tau \to \infty$ then $\xi(t)$ has the property of a strong mixing.
For arbitrary systems $\{\xi\} = \mathfrak{A}'$ and $\{\eta\} = \mathfrak{A}''$ with finite second moments the author introduces the magnitude

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On a Strong Mixing Condition for Stationary Random Gaussian Processes

$$\varrho(\mathfrak{A}', \mathfrak{A}'') = \sup_{\xi,\eta} \frac{|M(\xi - M\xi)(\eta - M\eta)|}{[M(\xi - M\xi)^2 M(\eta - M\eta)^2]^{1/2}} .$$

If $\mathfrak{A}'$ and $\mathfrak{A}''$ are the sets of all magnitudes with finite second moments being measurable with respect to $\mathfrak{M}'$ and $\mathfrak{M}''$ then, according to the definition (Ref.2)

$$\varrho(\mathfrak{M}', \mathfrak{M}'') = \varrho(\mathfrak{A}', \mathfrak{A}'')$$

is the maximal correlation coefficient between $\mathfrak{M}'$ and $\mathfrak{M}''$.
It always holds
(1) $$\alpha(\mathfrak{M}', \mathfrak{M}'') \leqslant \varrho(\mathfrak{M}', \mathfrak{M}'').$$

Let $\{\xi\}$ and $\{\eta\}$ be two sets of random magnitudes having Gaussian distributions (for arbitrary finite $\xi_1, \dots, \xi_m$ and $\eta_1, \dots, \eta_n$). Let $\mathfrak{M}_\xi$ and $\mathfrak{M}_\eta$ be σ-algebras generated by the events $(\xi \in \Gamma')$ and $(\eta \in \Gamma'')$, where Γ' and Γ'' are arbitrary Borel sets on the straight line. Let H_ξ, H_η be closed linear closures (in the quadratic mean) of the sets $\{\xi\}$ and $\{\eta\}$.
Theorem 1:
(2) $$\varrho(\mathfrak{M}_\xi, \mathfrak{M}_\eta) = \varrho(H_\xi, H_\eta).$$
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Theorem 2: The maximal correlation coefficient satisfies

$$(3) \qquad \alpha(\mathfrak{M}_{\xi}, \mathfrak{M}_{\eta}) \leq \varrho(\mathfrak{M}_{\xi}, \mathfrak{M}_{\eta}) \leq 2\pi\alpha(\mathfrak{M}_{\xi}, \mathfrak{M}_{\eta}).$$

From the theorems 1 and 2 there follows that a Gaussian stationary process $\xi(t)$ has the property of strong mixing then and only then if for the maximal correlation coefficient it holds $\varrho(\mathfrak{M}^{+}_{-\infty}, \mathfrak{M}^{\infty}_{t+\tau})$ for $\tau \to \infty$.

Let $\xi(t)$ be a stationary process in the weak sense and

$$\varrho(\tau) = \varrho(H^{t}_{-\infty}, H^{\infty}_{t+\tau}).$$

Let the spectral function $F(\lambda)$ be absolutely continuous; let $f(\lambda)$ be the spectral density.

Theorem 3: In the case of an integral time it holds

$$(4) \qquad \varrho(\tau) = \inf_{\varphi} \operatorname{vrai} \sup_{\lambda} \left[|f(\lambda) - e^{i\lambda\tau}\varphi(e^{-i\lambda})| \frac{1}{f(\lambda)} \right],$$

where $\inf_{\varphi}$ is taken over all $\varphi(z)$ being analytically continuable into

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On a Strong Mixing Condition for Stationary Random Gaussian Processes

the interior of the interior of the unit circle. In the case of a continuous time it holds

$$(4') \qquad \varrho(\tau) = \inf_{\varphi} \operatorname{vrai} \sup_{\lambda} \left[\left| f(\lambda) - e^{i\lambda\tau} \varphi(\lambda) \right| \frac{1}{f(\lambda)} \right],$$

where $\inf_{\varphi}$ is taken over all functions $\varphi(z)$ being analytically continuable into the lower halfplane.

Theorem 4: If there exists a $\varphi_0(z)$ being analytic in the interior of the unit circle (for a discrete time) or in the lower halfplane (for a continuous time) and having the boundary value $\varphi_\xi(e^{-i\lambda})$ and $\varphi_\xi(\lambda)$ respectively, and having the property that f/φ_0 is uniformly continuous in λ and $|f/\varphi_0| \geqslant \varepsilon > 0$ holds for almost all λ then for $\tau \to \infty$ it holds

$$(7) \qquad \varrho(\tau) \to 0.$$

Card 4/5

KOLMOGOROV, A.N.

"Approximation of the Distributions of Sums of Independent Variables by Infinitely Divisible Distributions."

[Moscow State University imeni M.V.Lomonosov]

report to be presented 22 June 1960 at the 4th Symposium on Mathematics Statistics and Probability -Berkeley, California, 20 Jun- 30 Jul 1960.

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, A.N.; SARMANOV, O.V.

S.N. Bernshtein's works on the theory of probability; on his 80th birthday. Teor. veroiat. i ee prim. 5 no.2:215-221 '60. (MIRA 13:9)

(Bernshtein, Sergei Natanovich, 1880-)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

S/052/60/005/004/003/007
C 111/ C 333

AUTHORS: Gnedenko, B. V., Kolmogorov, A. N., Prokhorov, Yu. V., Sarmanov, O. V.

TITLE: On the Work of N. V. Smirnov in Mathematical Statistics (On the Occasion of his 60-th Birthday)

PERIODICAL: Teoriya veroyatnostey i yeye primeneniye, 1960, Vol. 5, No. 4, pp. 436-440

TEXT: On October 17, 1960 Nikolay Vasil'yevich Smirnov, Corresponding Member of the Academy of Sciences USSR, Professor, had his 60-th birthday.

The first group of his papers is devoted to non-parametric problems. He considers: the distribution of the criterion ω^2 of Mises, the deviations from the empiric curves, "criterion of Smirnov".

The second group deals with the properties of the terms of the variation series. For papers of this group N. V. Smirnov obtained the Stalin prize. The third group is devoted to probability theory.

The authors call special attention to the difficulty of the considered problems and the elegance of the solutions.

Card 1/2

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GNEDENKO, B.V.; KOLMOGOROV, A.N.

Aleksandr IAkovlevich Khinchin; obituary. Usp. mat. nauk 15 no.4:97-110 Jl-Ag '60. (MIRA 13:9)
(Khinchin, Aleksandr Iakovlevich, 1894-1959)

KOLMOGOROV, A. N.

"On the Three-Dimensional Arrangement of One-Dimensional Complexes"
(20 May 1960)

report delivered at a seminar on cybernetics, Moscow State University

So: Problemy kibernetiki, Issue 5, 1961, pp. 289-294

KOLMOGOROV, A. N. (USSR)

"Some remarks on the fluctuations in the Boundary layer."

Presented at the International Symposium on Fundamental Problems in Turbulence and Their Relation to Geophysics, Marseille, France, Sept. 4-9, 1961

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, Andrey Nikolayevich, akademik

Discussing the problems of today's cybernetics; automatic machines and life (to be concluded). Tekh.mol. 29 no.10:16-19 '61. (MIRA 14:10)

(Cybernetics)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

KOLMOGOROV, A.N., akademik; BRUYEVICH, N.G., akademik

Discussion of present-day problems in cybernetics (to be continued). Tekh.mol. 29 no.11:30-33 '61. (MIRA 14:11)
(Cybernetics)

KOLMOGOROV, Andrey N.

"3-entropy of classes of functions and the algorithmic complexity of 3-approximation of an individual function"
To be presented at the IMU International Congress of Mathematicians 1962 - Stockholm, Sweden, 15-22 Aug 62

Active Member, Acad. of Sciences USSR; Head, Statistical Laboratory, Moscow State Univ. (1962 position)

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, A. N.

"Program complexity and algorithm complexity in construction of finite sequences"

report submitted for the Intl. Symposium on Relay Systems and Finite Automata Theory (IFAC), Moscow, 24 Sep-2 Oct 1962.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

KOLMOGOROV, A. N. and OFMAN, Yu. P.

"On problem solution by automata consisting of simple elements"

report submitted for the Intl. Symposium on Relay Systems and Finite Automata Theory (IFAC), Moscow, 24 Sep-2 Oct 1962.

VOROB'YEV, N.N., red.; GNEDENKO, B.V., red.; DOBRUSHIN, R.L., red.; DYNKIN, Ye.B., red.; KOLMOGOROV, A.N., red.; KUBILYUS, I.P. [Kubilius, I.P.], red.; LINNIK, Yu.V., red.; PROKHOROV, Yu.V., red.; SMIRNOV, N.V., red.; STATULYAVICHYUS, V.A.[Statuliavicius, V.A.], red.; YAGLOM, A.M., red.; MELINENE, D., red.; PAKERITE,O., tekhn. red.

[Transactions of the Sixth Conference on Probability Theory and Mathematical Statistics, and of the Colloquy on Distributions in Infinite-Dimensional Spaces]Trudy 6 Vsesoiuznogo soveshchaniia po teorii veroiatnostei i matematicheskoi statistike i kollokviuma po raspredeleniiam v beskonechnomernykh prostranstvakh. Vilnius, Palanga, 1960. Vil'nius, Gos.izd-vo polit. i nauchn. lit-ry Litovskoi SSR, 1962. 493 p. (MIRA 15:12)

1. Vsesoyuznoye soveshchaniye po teorii veroyatnostey i matematicheskoy statistike i kollokviuma po raspredeleniyam v beskonechnomernykh prostranstvakh. 6th, Vilnius, Palanga, 1960. (Probabilities—Congresses) (Mathematical statistics—Congresses) (Distribution (Probability theory))—Congresses)

KOLMOGOROV, A.N.

Automatons and life. Fiz mat spisanie BAN 5 no.3:198-204 '62.

KOLMOGOROV, A.N.

Automata and life. Pt. 2. Fiz mat spisanie BAN 5 no.4: 282-289 '62.

AYVAZYAN, S.A.; KOLMOGOROV, A.N.; MESHALKIN, L.D.; PISARENKO, V.F.

"Mathematical statistics in technics" by A.M. Dlin. Reviewed by S.A. Aivazian and others. Teor. veroiat. i ee prim. 7 no.2: 243-248 '62. (MIRA 15:5)

(Mathematical statistics)
(Dlin, A.M.)

KOLMOGOROV, A.N.

B.V. Gnedenko's works on the probability theory; on his 50th
birthday. Teor. veroiat. i ee prim. 7 no.3:323-329 '62. (MIRA 15:7)
(Gnedenko, Boris Vladimirovich, 1912-)
(Probabilities)

GIKHMAN, I.I.; KOLMOGOROV, A.N.; KOROLYUK, V.S.

Boris Vladimirovich Gnedenko; on his 50th birthday. Usp.
mat.nauk 17 no.4:191-200 '62. (MIRA 15:8)
(Gnedenko, Boris Vladimirovich, 1912-)

KOLMOGOROV, A.N., akademik

We need a new definition of life. Nauka i zhizn' 29 no.4:12-13 Ap '62. (MIRA 15:7)

(LIFE (BIOLOGY))

KOLMOGOROV, A.N., akademik; MISHCHENKO, Ye.F.; PONTRYAGIN, L.S., akademik

Probability problem of optimum control. Dokl.AN SSSR 145 no.5:993-995 '62. (MIRA 15:8)

1. Matematicheskiy institut im. V.A.Steklova AN SSSR.
(Probabilities) (Automatic control)

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

ARATO, M.; KOLMOGOROV, A.N., akademik; SINAY, Ya.G.

Evaluation of the parameters of a complex stationary Gaussian type Markov process. Dokl. AN SSSR 146 no.4:747-750 O '62. (MIRA 15:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

(Markov processes)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, A.N.

Approximation of the distributions of sums of independent items by infinitely devisible distributions. Trudy Mosk. mat. ob-va 12:437-451 '63. (MIRA 16:11)

1. Parokhod "Sergey Kirov", Krasnoye more - Persidskiy zaliv.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

VISHIK, M.I.; KOLMOGOROV, A.N.; FOMIN, S.V.; SHILOV, G.Ye.

Izrail' Moiseevich Gel'fand, 1913- ; on his 50th birthday.
Usp. mat. nauk 19 no.3:187-205 My-Je '64.
(MIRA 17:10)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

ALEKSANDROV, P.S.; KOLMOGOROV, A.N.

Lev Abramovich Tumarkin, 1904- ; on his 60th birthday. Usp. mat. nauk 19 no.4:219-221 '64.

(MIRA 17:10)

L 6719-65 EWT(d)/EED-2 Pb-4/Po-4/Pq-4/Pg-4/Pk-4 IJP(c)/SSD/ASD(d)/RAEM(i)/
[illegible] AFETR/AFTC(p)/AMD/ESD(dp)/ESD(t)/RAEM(t) BB/GO

[illegible] NR: AP4042198 S/0020/64/157/002/0303/0306

[illegible]irmazin, M. A.; Kolmogorov, A. N. (Academician)

[illegible] one class of correction codes

[illegible] AN SSSR. Doklady, v. 157, no. 2, 1964, 303-306

TOPIC TAGS: correcting code, cybernetics, kN code, error detection code, control theory

ABSTRACT: The author introduces symbols and definitions useful in the study of the systems of information communication. He uses these symbols for expressing theorems most of which are contained in the book by W. Peterson "Error Correcting Codes" (New York, 1961). The paper concerns particularly with the kN-codes (k informational and [log(N+1)] error-checking symbols, which comprise the totality of N, 2N, . . . $(2^k-1)N$ numbers). No simple method of decoding of [illegible] are known at present. It appears that they are more useful [illegible] detection than in error correction. Orig. art. has: 4 equations

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L 6719-65

ACCESSION NR: AP4042198

ASSOCIATION: None

SUBMITTED: 04[illegible]63

ENCL: 00

SUB CODE: DP

NR REF SOV: 000

OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

EWT(d)/ IJP(c)/SSD/ASD(a)-5/AFWL/AFMD(c)/AFETR AFTC(a)/ESD(dp)/
ACCESSION NR: AP4045619 ESD(gs) S/0020/64/158/002/0281/0283

AUTHOR: Freydlin, M. I.; Kolmogorov, A. N. (Academician) B

TITLE: On a priori estimates of solutions of degenerate elliptic equations

SOURCE: Doklady*, v. 158, no. 2, 1964, 281-283

TOPIC TAGS: degenerate elliptic equation, a priori solution estimate, Markov process, Markov process trajectory, Dirichlet problem, elliptic operator

ABSTRACT: Determination of certain a priori estimates of the generalized solution of the Dirichlet problem

$$Lu(x) - c(x)u(x) = 0, \quad x \in D, \qquad (1)$$
$$u(x)|_{\Gamma} = \psi(x),$$

where L is an elliptic differential operator (it can also be degenerate), c(x) is a continuous nonnegative function in n-dimensional space, and $\psi(x)$ is continuous on the boundary Γ, constructed earlier

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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

L 14579-65

ACCESSION NR: AP4045619

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by the author (Akademiya nauk SSSR, Izvestiya, ser. matem., v. 25, no. 6, 1962), is considered. On the basis of a certain Stochastic equation, the Markov process is constructed by which a new expression for the generalized solution of (1) is derived whose behavior is analyzed in connection with the behavior of the Markov process trajectories. Conditions are presented under which a priori estimates of the generalized solution and of its derivatives are established. Estimates derived make it possible to analyze the smoothness of solutions of the degenerate equations as well as to construct the generalized solution of the Dirichlet problem for degenerate quasi-linear equations. Orig. art. has: 4 formulas.

ASSOCIATION: none

SUBMITTED: 1Apr64 ENCL: 00 SUB CODE: MA

NO REF SOV: 004 OTHER: 000

KOLMOGOROV, A.N.

Three approaches to defining the concept "quantity of information."
Probl. pered. inform. 1 no.1:3-11 '65. (MIRA 18:7)

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

L [illegible] EWT(d)/T IJP(c)

ACCESSION NR: AP5014804 UR/0030/65/000/005/0094/0096

AUTHOR: Kolmogorov, A. N. (Academician)

31
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B

16

TITLE: Problems in probability theory and mathematical statistics

SOURCE: AN SSSR. Vestnik, no. 5, 1965, 94-96

TOPIC TAGS: probability, mathematic statistics, information theory

ABSTRACT: The present state of and basic trends in probability theory and mathematical statistics were evaluated by Academician A. N. Kolmogorov at a meeting of the Department of Mathematics of the Academy of [illegible] problems in the field of limit [illegible] exhausted there is now a great deal of activity in this field of probability theory.

Certain problems in the field of limit theorems were discussed in a report by [illegible] ulyavichyus entitled "Limit theorems in boundary problems and their applications", which was presented on 29 October 1964 at an

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ACCESSION NR: AP5014804

earlier general meeting of the Department of Mathematics. At the same meeting, A. A. Borovkov reported on his studies of a second trend originated by G. Cramer in the field of the so-called "large deviations theorems" and on their important applications to mathematical statistics.

It was also stressed that the USSR continues to play an important role in developing the theory of Markov processes, primarily due to studies conducted by T. B. Dynkin's school. However, more attention should be given to new problems in the theory of Markov processes which cover a wider [illegible] applications. In particular, it is considered urgently necessary to study Markov processes of the form

$$x(t) = \{ x_1(t), x_2(t) \},$$

where only the component $x_1(t)$ can be observed statistically. It was indi- [illegible] interesting ideas or solving problems arising in such

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Markovian processes have been formulated by R. L. Stratonovich in his theory of "conditional Markov processes," but it is regrettable that his studies lack the necessary accuracy. A. D. Ventzel explained in his report how certain parts of this theory can be developed with the required accuracy.

The spectral theory of stationary processes is developing very rapidly at present. Particular attention is being paid to the "nonlinear" spectral theory, which is essential in studying various problems in radio engineering, transmission of information, and other fields.

The opinion was expressed that several years ago Soviet scientists were behind Western scientists in the field of information theory, but now this lag has been eliminated. Studies by the late A. Ya. Khinchin and R. L. Dobrushin occupy a prominent place in international science. The concept of information is not of its own nature a probabilistic concept, but probabilistic methods prevail in more advanced chapters of information theory. [illegible] that the relation between information theory and probabil- [illegible] ally changed by [illegible] as the basis for the probability theory.

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ACCESSION NR: AP5014804

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It was noted that the concepts of information theory (beginning with [illegible] fundamental concept of entropy) play a principal role in the recently [illegible] "theory of dynamic systems." The analogy between dynamic systems and random processes was understood long ago, but in recent studies originated by A. N. Kolmogorov and continued by V. A. Rokhlin and, in particular, by Ya. G. Sinay, this analogy has become more evident. In particular, Ya. G. Sinay has proved an old hypothesis concerning the asymptotically normal distribution of the "staying time" in various domains of phase space.

Despite the fact that outstanding studies were conducted by N. B. Smirnov, Yu. B. Linnik, and their co-workers, it was stressed that activities of Soviet mathematicians in the field of mathematical statistics are [illegible]. It is considered that such an unsatisfactory situation pre- [illegible]

[illegible]

mathematicians have had only quite accidental contact with this kind of work.

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ACCESSION NR: AP5014804

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It was revealed that extensive work has been done at the Mathematical Institute im. V. A. Steklova of the Academy of Sciences USSR under the [illegible] V. Smirnov and L. N. Bol'shov on the [illegible] practical work and also in the compilation of new statistical tables.

ASSOCIATION: none

SUBMITTED: 00	ENCL: 00	SUB CODE: MA
NR REF SOV: 000	OTHER: 000	FSB v. 1, no. 8

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L 45189-65 EWT(d) IJP(c)

ACCESSION NR: AP5009208 S/0020/65/161/001/0009/0012

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14

B

AUTHOR: Arnol'd, V. I.; Kolmogorov, A. N.

TITLE: Validity conditions of the error in an averaging method for systems which pass through resonance in the process of evolution

SOURCE: AN SSSR. Doklady, v. 161, no. 1, 1965, 9-12

16

TOPIC TAGS: validity condition, error evaluation, averaging method, resonance, evolution

ABSTRACT: The behavior of solutions of systems of the form

$$\dot\varphi = \omega(I;\varepsilon) + \varepsilon f(I,\varphi;\varepsilon), \quad \dot I = \varepsilon F(I,\varphi;\varepsilon), \quad \varphi = \varphi_1,\dots,\varphi_k; \quad I = I_1,\dots,I_l \qquad (1)$$

(where φ (mod 2π) are angles; $\varepsilon \ll 1$; the dot indicates the derivative with respect to time t; functions ω, f, F are analytic at $I \in G$, $|\mathrm{Im}\,\varphi| < \rho$, $|\varepsilon_0| < \varepsilon_0$; G is a complex compact region) is generally studied by the "averaging method," that is, by replacing equation (1) by the averaged system

$$\dot J = \varepsilon \bar F(J), \quad \bar F(J) = (2\pi)^{-k}\iint F(J,\varphi;0)\,d\varphi. \qquad (2)$$

Although the terms $\varepsilon \tilde F = \varepsilon F - \varepsilon \bar F$ which are discarded in averaging

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ACCESSION NR: AP5009208

are of the same order of magnitude as those which remain, it is assumed that in the course of time $t \sim 1/\varepsilon$ the difference between exact and averaged solutions with identical initial conditions $|I(t) - J(t)|$ remains small. In a single-frequency system (k = 1) the following estimate is easily arrived at

$|I(t) - J(t)| < C_1\varepsilon \; ; (0 \le t < 1/\varepsilon)$. Here, $C_1, \ldots, C_{22}$ are sufficiently large constants independent of $\varepsilon, K, N, \varkappa^{-1}$. This article considers the two-frequency system (k = 2). We assume conditions sufficient for the smallness of $|I - J|$ and obtain the estimate

$C_2^{-1}\sqrt{\varepsilon} \le |I(t) - J(t)| < C_3\sqrt{\varepsilon}\ln^2(1/\varepsilon)$. Calculations are adduced for two sample systems. Orig. art. has: 12 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 01Oct64 ENCL: 00 SUB CODE: MA

NR REF SOV: 004 OTHER: 001

Card 2/2

L 23534-66 EWT(1)/FCC GW

ACC NR: AP6003482 (N) SOURCE CODE: UR/0020/66/166/001/0049/0052

AUTHOR: Yaglom, A. M.; Kolmogorov, A. N. (Academician) 31

ORG: Institute for the Physics of the Atmosphere of the AN SSSR (Institut fiziki atmosfary AN SSSR) B

TITLE: The effect of fluctuations in the dissipation of energy on the form of the turbulence characteristics in an inertial interval

12,44755

SOURCE: AN SSSR. Doklady, v. 166, no. 1, 1966, 49-52

TOPIC TAGS: atmospheric turbulence, kinetic energy conversion

ABSTRACT: An important part of the modern theory of the local structure of developed turbulence is the "two-thirds" law proposed by Kolmogorov and Obukhov for the longitudinal and transverse structural functions of the velocity field $D_{LL}(r)$ and $D_{NN}(r)$ in the inertial interval $L \gg r \gg \eta$ (where L and η are the external and internal scales of the turbulence), and the corresponding "five-thirds" law for the velocity spectrum $E(k)$ in the interval $1/L \ll k \ll 1/\eta$. It has been shown, however, that these laws cannot be completely exact because of the presence of random fluctuations of the quantity

$$\varepsilon = \frac{\nu}{2}\sum_{i,j}\left(\frac{\partial u_i}{\partial x_j}+\frac{\partial u_j}{\partial x_i}\right)^2, \qquad (1)$$

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UDC: 532.517.4

Card

ACC NR: AP7005425 SOURCE CODE: UR/0042/66/021/004/0275/0278

AUTHOR: Kolmogorov, A. N.

"P. S. Alexandroff and the Theory of δs Operations"

Moscow, Uspekhi Matematcaaticheskikh Nauk, No. 4, Vol. 21, 1966, pp 275-278

Abstract: Kolmogorov reviews Alexandroff's contributions to the theory of δs operations. Sets of simply defined points of a numerical line are either finite, countable, or have the power of a continuum. The "continium problem" seeks to find whether this is true for any subset of a numerical line. Alexandroff and Hausdorff solved the continium problem for Borel sets, proving that a Borel set whose power is greater than that of a countable set contains a complete subset. Analytical and positive operations may be replaced by an analytical positive operation on the given sets and their complements. The class of analytical positive operations coincides with δs operation. A real topology is shown to exist in the space of subsets of a natural series.

It is pointed out that only Suslin sets can be obtained by using the δs operation with a closed set of subsets of a natural series. In one standard δs operation, called the A operation, strings of natural numbers are used. Any Borel set can be obtained by an A operation from a closed set. As pointed out by Suslin, A sets (Suslin sets) exist which are not Borel sets. Finally, the author treats Alexandroff's Γ-operation. Orig. art. has: 3 formulas.

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UDC: 513.83

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ACC NR: AP7005425

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

ORG: none

TOPIC TAGS: topology, mathematics

SUB CODE: 12 / SUBM DATE: 30Jun66 / ORIG REF: 001 / OTH REF: 005

Card 2/2

ACC NR: AP6004983 SOURCE CODE: UR/0406/65/001/001/0003/0011

AUTHOR: Kolmogorov, A. N.

40
B

ORG: None

6

TITLE: Three approaches to the determination of the concept of "the quantity of information"

SOURCE: Problemy peredachi informatsii, v. 1, no. 1, 1965, 3-11

TOPIC TAGS: information theory, probability

ABSTRACT: The author presents detailed descriptions of two known approaches to the determination of the concept of "the quantity of information," the combinatorial approach and the probabilistic approach. The author introduces a new approach, the algorithmic approach, which employs the theory of recursive functions. The approach introduced has one substantial shortcoming: it does not account for the "difficulties" in processing program p and the object x (the concept of the quantity of information "in something") into the object y (the concept of the quantity of information "about something"). The author notes that the present note does not include discussions on the application of the constructions used on the algorithmic approach to a new basis for the theory of probability. An incomplete presentation of this idea is found in an earlier work (On tables of random numbers. Sankhya. The Indian Journal of Statistics, 1963, Series A, 25, 4, 369-376.).

SUB CODE: 09, 12 / **SUBM DATE:** 09Jan65 / **ORIG REF:** 001 / **OTH REF:** 001

UDC 621.391.12

Card 1/1 BLG

DURNOV, V.K.; BABUSHKIN, N.M.; PUSHKASH, I.I.; Prinimali uchastiye: KOLMOGOROV, A.V.; KLEPTSIN, V.G.; MASLENNIKOVA, E.G.; GORYACHEVA, A.V.; BARAKHVOSTOV, V.S.; RASIN, B.S.; ZEMLYAKOV, A.A.; BAROSHINA, G.V.

Distribution of the temperature of the hot blast in the tuyere passage of the blast furnace. Stal' 25 no.3:205-209 Mr '65. (MIRA 18:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut metallurgicheskoy teplotekhniki i Nizhne-Tagil'skiy metallurgicheskiy kombinat (for Durnov, Babushkin, Pushkash).

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

OKUNEV, A.I.; KUSAKIN, P.S.; VATOLIN, N.A.; KOLMOGOROV, B.A.; ZAMORIN, L.N.

Obtaining metallic nickel directly from a liquid matte.
Trudy Inst. met. UFAN SSSR no.8:75-82 '63.
(MIRA 17:9)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

KOLMOGOROV, I.

107-57-5-54/63

AUTHOR: Kolmogorov, I. (Kachiry, Kazakh SSR)

TITLE: Repairing a Detent (Remont fiksatora)

PERIODICAL: Radio, 1957, Nr 5, p 55 (USSR)

ABSTRACT: A broken detent spring of a bandswitch can be easily replaced without removing the bandswitch from the chassis. A piece of ol(phonograph spring cut to shape is used for replacement.

One figure illustrates the method of repair.

AVAILABLE: Library of Congress

Card 1/1

Card 1/1

KOLMOGOROV, N.A.

22918 Geometrioya tetradra yevklidova i neevklidova prostranstva, Uchen. Zapiski (kirovskiy gos. ped. in-t im. lenina) Vyp. 5, 1948. C 64-143. Bibliogr: 26 nazv.-

SO: LETOPIS' NO. 31, 1949

6

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, N. A.

21330 KOLMOGOROV, N. A. Osnovnye formuly gipersfericheskoy tetraedpometrii. Uchen zapiski (Mosk. Gos. UN-T Im. Lomonosova), Vyp. 135, Matematika, T. II, 1948 (NA Obl: 1949), S. 188-91.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

KOLMOGOROV, N. A.

1

Kolmogorov, N. A. Analogues of double or anharmonic ratios for a space of three or more dimensions and their application to the proof of some theorems. Kirov. Gos. Ped. Inst. Uč. Zap. 1953, no. [illegible] (Russian)

The biratio (i.e., the anharmonic ratio) of six noncoplanar points A, B, C, D, E, F, in ordinary space is defined to be the expression

$$\frac{\text{vol. }\overline{ABEC}}{\text{vol. }\overline{ABED}} \quad \text{vol. [illegible]}$$

the four terms of which are oriented volumes of tetrahedrons. The biratio is denoted by the symbol $(ABCDEF)$. In order to study this new symbol the author proves the relation

$$(ABDE, ABCF) + (ABCD, ABEF) [illegible]$$

thus generalizing a relation [illegible] Polytech. 8 (1809), 66–117; M. Chasles, Traité de géométrie supérieure, Bachelier, Paris, 1852, art. 30, pp. 23–24; J. Neuberg, Mathesis (3) 7 (1907), 73–75, Lemma, p. 73]. With the help of this relation it is shown that if in $(ABCDEF)$ the letters A, B remain fixed, the $4!$ permutations of the symbol give rise only to six distinct values which are related to each other in the same way as values of the biratios of four collinear points.

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Kolmogorov N.A.

The final result arrived at is that the 6! permutations of the new symbol give rise to $6!/4 \cdot 2! = 90$ distinct values, and of those only three are unrelated, the remaining values being functions of those three and [illegible] readily computed.

If in $(ABCDEX) = a_1$ the first five points are fixed and a_1 is a given constant, the variable point X [illegible] plane, the locus of points the ratio of whose distances from the two fixed planes ABC, ABD is constant. The above equality may thus be considered [illegible]

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from the two fixed planes ABC, ABD is constant. The above equality may thus be considered as the equation of the plane ABX.

The three simultaneous equations:

$$(ABCDEX) = \lambda_1, \quad (BCDEXA) = \lambda_2, \quad (C[illegible]) = \lambda_3,$$

where the points A, B, C, D, E [illegible] are three given unrelated constants, determine the position of X as the point of intersection [illegible] planes ABX, BCX, CDX. The constants [illegible] be the projective coordinates [illegible] relative to the five fixed points.

If M_i ($i = 1, 2, \ldots, n, n+1, n+2, n+3$) are $n+3$ points in an n-dimensional space, their biratio in that space is, by definition, the expression

$$\frac{\text{hypervol.}\ (\overline{M_1M_2 \cdots M_nM_{n+1}})}{\text{hypervol.}\ (\overline{M_1M_2 \cdots M_nM_{n+2}})}$$

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Kolmogorov, N.A.

$$\frac{\text{hypervol. } (M_1M_2 \cdots [illegible])}{\text{hypervol. } (M_1M_2\cdots M_{n+1}M_{n+3})}$$

and denoted symbolically by

$$(M_1M_2\cdots M_nM_{n+1}M_{n+2}M_{n+3}),$$

the terms of the fractions being [illegible] *n*-dimensional simplexes. (Note [illegible] (ABCDEF) given above is [illegible] generalization, the positions of the two pairs of points C, D and E, F should be interchanged; this change, however, does not affect the value of the symbol.)

The author states that it may be proved without much trouble that of the (n+3)! possible permutations of the symbol only (n+3)(n+4) [illegible] of these only *n* are independent of one another, and the rest are functions of the independent values.

If we consider the *n* simultaneous equations:

$$(M_1M_2\cdots M_nM_{n+1}M_{n+2}X)=m_1,$$

$$(M_2M_3\cdots M_nM_{n+1}M_{n+2}XM_1)=m_2,$$

$$(M_nM_{n+1}M_{n+2}XM_1M_2\cdots M_{n-1})=m_n,$$

where X is a variable [illegible]

[illegible]

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Kolmogorov, N. A.

these equations determine the position of Y [illegible] the point of intersection of a hyperplane [illegible] considered as the [illegible] space.

The author uses the new [illegible] Ceva's and Menelaus' theorems [illegible] simplex, and to determine the intersection of that simplex [illegible] with a hypersphere. *N. A. Court* (Norman, Okla.)

4/4

BEREZANSKAYA, Yelizaveta Savil'yevna; KOLMOGOROV, Nikolay Andreyevich;
NAGIBIN, Fedor Fedorovich; CHERKASOV, Rostislav Semenovich;
LEPESHKINA, N.I., red.; GOLOVKO, B.N., tekhn.red.; KORNEYEVA,
V.I., tekhn.red.

[Collection of problems and exercises on geometry; textbook for secondary school teachers] Sbornik zadach i voprosov po geometrii; posobie dlia uchitelei srednei shkoly. Moskva, Gos. uchebno-pedagog.izd-vo M-va prosv.RSFSR, 1959. 207 p. (MIRA 13:10)

(Geometry--Problems, exercises, etc.)

BUDANTSEV, P.A., red. (g.Orenburg); KARNATSEVICH, V.S., red. (g.Tyumen'); KOLMOGOROV, N.A., red.(g.Kirov): KOCHETKOVA, Ye.S., red. (g.Chelyabinsk); NAGIBIN, F.F., red. (g.Kirov); YAKOVKIN, M.V., red.; SHCHEPTEVA, T.A., tekhn. red.

[Teaching mathematics in secondary schools; second collection of articles by the stabl members of the Ural pedagogical institutes] Voprosy prepodavaniia matematiki v srednei shkole; vtoroi sbornik statei rabotnikov kafedr pedagogicheskikh institutov Ural'skoi zony. Posobie dlia uchitelei. Moskva, Gos. uchebno-pedagog. izd-vo M-va prosv. RSFSR, 1960. 214 p. (MIRA 14:10)

(Mathematics—Study and teaching)

KOLMOGOROV, P.A., tekhnik

Conveyor gallery 901m long completed in a month with the PK-3 cutter-loader. Shakht. stroi. 7 no.4:18-19 Ap '63. (MIRA 16:3)

1. Shakhta "Polysayevskaya" No.2.

L 1708-66 EWT(1) GW

ACCESSION NR: AR5007331 S/0271/65/000/001/B061/B061
681.142:001

29 B

SOURCE: Ref. zh. Avtomatika, telemekhanika i vychislitel'naya tekhnika. Sv. t., Abs. 1B346

AUTHOR: Kolmogorova, P. P.

14,55

TITLE: Evaluation of composition of a (geological) base by a digital computer using gravitational and magnetic anomaly datae 12,44,55

CITED SOURCE: Sb. Issled. statist. i funktsional'n. lineyn. svyazey v gravirazvedke i magnitorazvedke, Novosibirks, 1963, 121-130

TOPIC TAGS: geologic survey, compute

TRANSLATION: The results are reported of an investigation of the potentialities of computer interpretation of gravitational- and magnetic-survey data. Correlations between gravitational and magnetic anomalies are used for evaluating the base composition. Some correlations are usually established by visual examining of geological and geophysical maps of the terrain, and hence, the evaluation of composition is only qualitative and roughly approximate. A mathematical analysis of survey data ensures efficiency of evaluation and is based on the quantitative

Card 1/2

Card2/2

KOLMOGOROV, R.I.

1968. Kolmogorov, R. I., A qualitative [illegible] regions of soil compaction [illegible] Leningr. Inzh. [illegible], 1954; Rev. no. 1003, Ref. Zh. Mekh. 1955.

Experiments were made on models of the [illegible] compaction regions [illegible] piles driven into dry, screened sand. During sinking [illegible] the piles, the following regions were observed and measured: a upward thrust; c lateral displacement; d and e downward displacement along curved and straight paths, respectively. (Printing errata—p. 88, l. 17 from above, should be Ab instead of Ab [illegible] of "b").

The experiments have shown [illegible] the compacted zones [illegible] During [illegible] blunt-pointed pile these regions are [illegible] between hanging piles is, according [illegible]

Courtesy of Referativnyi Zhurnal
Translation, courtesy Ministry of Supply, England

MEDVEDEV, Pavel Mikhaylovich; KOLMOGOROV, R.I., red.; VOLCHOK, K.M., tekhn.red.

[Principles of building] Osnovy stroitel'nogo dela. Leningrad, Izd-vo "Rechnoi transport". Leningr.otd-nie, 1960. 303 p.

(Building) (MIRA 13:6)

BUTYLIN, A.M.; KOLMOGOROV, R.I., kand. tekhn.nauk, dots., red.;
VOLCHOK, K.M., tekhn. red.

[Drawing and reading architectural and construction plans]
Sostavlenie i chtenie arkhitekturno-stroitel'nykh chertezhei.
Moskva, Izd-vo "Rechnoi transport," 1963. 59 p.
(MIRA 17:1)

KOLMOGOROV, S.M., model'shchik; VORONTSOV, Ye.S., inzhener, retsenzent;
MIKHEYEV, N.P., inzhener, retsenzent.

[Making models] Iz opyta izgotovleniia model'nykh komplektov. Sverdlovsk, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry [Uralo-Sibirskoe otd-nie] 1953. 21 p.
(Models and modelmaking) (MLRA 7:6)

GIMMEL'MAN, Nikolay Robertovich; KOCHUROV, Aleksey Stepanovich;
Prinimali uchastiye: BORISOV, A.P., inzh.; ZHIDKIKH, I.A.,
inzh.; VOLEGOV, A.F., inzh.; SHABALIN, L.A., inzh.
MIKHEYEV, N.P., kand.tekhn.nauk, retsenzent; ABAKUMOV, S.F.,
inzh., retsenzent; ZASYPKIN, A.G., inzh., retsenzent;
ZALOZHNEV, G.N., inzh., retsenzent; KLOTSMAN, M.I., inzh.,
retsenzent; KOLMOGOROV, S.M., inzh., retsenzent; BLANK, N.M.,
inzh., red.; DUGINA, N.A., tekhn.red.

[Making models] Model'noe proizvodstvo. 3. perer. izd.
Moskva, Mashgiz, 1961. 295 p. (MIRA 14:12)
(Engineering models)
(Molding (Founding)--Equipment and supplies)

KOLMOGOROV, V.

②

KOTOV, Ye. I.; BARCHEVSKY, V. ; KOLMOGOROV, V.

"Spectral Investigations of Molecular Ion Formation
on the Surface of Solids"
Presented at the IUPAC Symposium on Molecular Structure and Spectroscopy,
Tokyo, Janpan, 10-15 Sep 62.

KOLMOGOROV, V.G.

Calculation of the deviations of vertical lines based on gravity anomalies. Geol. i geofiz. no.8:100-106 '63. (MIRA 16:10)

1. Institut geologii i geofiziki Sibirskogo otdeleniya AN SSSR Novosibirsk.

(Gravity anomalies)

KOLMOGOROV, V.L., Cand Tech Sci--(diss) "Certain problems of the theory and practice of continuous pipe rolling on a long staightening device." Sverdlovsk, 1958. 16 pp; 1 sheet of drawings (Min of Higher Education USSR. Ural Polytech Inst im S.M. Kirov), 100 copies (KL,25-58, 113)

SOV/124-59-9-10628

Translation from: Referativnyy zhurnal, Mekhanika, 1959, Nr 9, p 146 (USSR)

AUTHOR: Kolmogorov, V.L.

TITLE: On Application of the Energy Principles of the Plasticity 26 Theory to Solving the Problems of Pressure Treatment of Metals 18

PERIODICAL: Sb. statey. Ural'skiy politekhn. in-t, 1958, Nr 64, pp 91-101

ABSTRACT: The author applies the energy principle to solving the problem on reduction of plates hitted with parallel plane strikers; the plate material is assumed to be ideally plastic. The approximate formula obtained for the total reduction stress is compared with the results from experiments on the reduction of rectangular aluminum parallelepipeds; the deviation amounts to 21%. Bibl. 15 titles.

I.A. Kiyko

Card 1/1 ✓

KOLMOGOROV, V.L.; SHVEYKIN, V.V.

Obtaining a gap between pipe and mandrel during rolling on continuous mills. Trudy Ural.politekh.inst. 73:207-215 '58. (MIRA 12:8)

(Rolling (Metalwork))

KOLMOGOROV, V.L.; SHVEYKIN, V.V.

Calculating deformations, force and the average specific
pressure in strip rolling on smooth rolls. Trudy Ural.
politekh.inst. 73:216-231 '58. (MIRA 12:8)
(Rolling (Metalwork))

"APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5

KOLMOGOROV, V.L.

Method of rupture solutions and its accuracy. Izv.vys.ucheb.
zav.; chern.met. no.3:26-29 '60. (MIRA 13:4)

1. Ural'skiy politekhnicheskiy institut i Pervoural'skiy
novotrubnyy zavod.
(Metalwork) (Deformations(Mechanics))

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000823910003-5"

20278

S/148/60/000/009/011/025
A161/A030

16.7300 also 1454

AUTHOR: Kolmogorov, V.L.

TITLE: The aspects of metal pressure working process investigation with plasticity theory methods

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 9, 1960, 79-89

TEXT: The modern mathematical theory of small plastic deformations is extraordinarily complex in view of the nonlinear relation between stresses and deformations, and even modified approximate methods lead to very complex equations, the full solution of which is very difficult if at all possible. The author suggests a plasticity condition that makes it possible to determine approximately (and with sufficient accuracy for engineering calculations) the relation between stresses and deformations in the hot plastic deformation of metals. The mathematical apparatus of the small plastic deformations theory is only applicable for 10-20% deformation (the higher this limit the less accurate are the results). Deformation to this degree is accompanied with most intensive strengthening, and the working

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complex strengthening law can be expressed with the known formula

$$T = g(\Gamma) \cdot \Gamma , \quad (1)$$

where $g(\Gamma)$ is the function of deformation intensity characteristical for the given material at a certain temperature and speed of deformation, and T - the intensity of tangential stresses. The strengthening law (1) in the first approximation can be expressed as

$$T = \mathrm{tg}\,\varphi\,\Gamma, \quad (2)$$

where tg φ is a constant value - the strengthening modulus, or the mean angular coefficient of the strengthening curve. The hypothetical material the strengthening law of which is the formula (2) can be called "nonrigid linear strengthening material". Such theoretical material as well as ideally plastic material reflect only inaccurately the real process and may be considered as a kind of approximation "from right and left", or patterns of real metal (Fig. 1). It has been stated in experiments (carried out by the

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A161/A030

The aspects of metal pressure ...

author together with Engineer Yu. V. Tishinskiy) that not the ideally plastic metal but the nonrigid linear strengthening gives results nearer to the real (Fig. 2). The dependence of the deformation line on temperature could not be determined. The equation of work, for determining the deformation efforts is evolved from equation (3) and equation (4) which is valid for the work of external forces and internal resistances in any solid medium:

$$\int_S (X_n \cdot u_n + Y_n \cdot v_n + Z_n \cdot w_n) dS = \int_V (\sigma_x \varepsilon_x + \sigma_y \varepsilon_y + \dots + \tau_{zx} \cdot \gamma_{zx}) \cdot dV \quad (4)$$

where X_n, Y_n, Z_n and σ_x, σ_y, ... τ_{zx} are external and internal stresses, and u_n, v_n, w_n; ε_x ε_y ... γ_{zx} the static corresponding displacements on the surface and deformations in the volume of the body. Substituting (3) and (4), the work equation (determining deformation efforts) for nonrigid linearly strengthening material is

$$\int_S (X_n u_n + Y_n v_n + Z_n w_n) dS = \int_V \mathrm{tg}\varphi \cdot \Gamma^2 \cdot dV , \quad (5)$$

Card 3/8

where $\Gamma = + \sqrt{4\varepsilon_x^2 + 4\varepsilon_y^2 + 4\varepsilon_x\varepsilon_y + \gamma_{xy}^2 + \gamma_{yz}^2 + \gamma_{zx}^2}$.

After determining the deformed state with the equation (5) the deformation effort can be calculated more accurately by substituting the displacement functions found in the variation equation (7) for nonrigid linear strengthening material in equation (4) for a body of real material with complex strengthening law. The result will be:

$$\int_S (X_n \cdot u_n + Y_n \cdot v_n + Z_n \cdot w_n) \cdot dS = \int_V g(\Gamma)\Gamma^2 \cdot dV \qquad (11)$$

The effort found with the formula (11) will be slightly higher than the real one in deformation, for the substituted functions are extremal. The problem of uniform compression of a pipe without a mandrel was analyzed and the result used for calculation graphs for ideal plastic and for strengthening